

JOURNAL

TRUCKING
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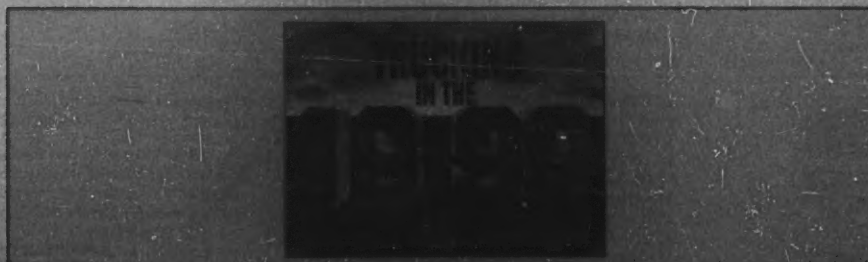


COMMERCIAL CARRIER JOURNAL

VOLUME 146 NUMBER 3 MARCH 1989

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IN THE NEXT ISSUE

The April issue will offer details on revised criteria for placing vehicles out of service at roadside safety inspections, which were established jointly by the U.S. Department Of Transportation and Commercial Vehicle Safety Alliance. Information will include how inspectors determine when a vehicle has an out-of-service defect requiring the unit to be repaired at the inspection site or towed

away, and when a vehicle with a restricted-service defect may be placed out of service or permitted to travel directly to a repair facility.

Much of the April issue will be devoted to the Fleet Reference Annual, with information on: reciprocity; registration; sizes and weights; permits and taxes; access restrictions; fuel taxes; where long combination vehicles can go. □

EDITORIAL STAFF

Editor-In Chief
GERALD STANDLEY
215-964-4513

Executive Editor
PARRY DESMOND
215-964-4539

Managing Editor
CAROLE SMITH
215-964-4524

Senior Technical Editor
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215-964-4517

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215-964-4521

Reprints/Clerical
CAROL HOPE
215-964-4530

Art Director
MICHAEL TRINSEY
215-964-4004

Contributing Editors
LEON WITCONIS
KENNETH PIERSON

EDITORIAL OFFICES
Chilton Way
Radnor, Pa. 19089

570 National Press Bldg.
Washington, D.C. 20045
202-662-8960

2600 Fisher Building
Detroit, Mich. 48202
313-875-2090

10982 Birch Drive
Denver, Colo. 80233
303-452-4739

24 White Street
San Francisco, Calif. 94109
415-474-8532

Photos by United Press
International, World Wide
Photos, Picture Group Inc.

Director, Industry Projects
EDWARD SHEA
215-964-4515

Publisher
RICHARD LAIMBEER
215-964-4511

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INDUSTRY WATCH

CCJ wins Neal awards for editorial excellence

Commercial Carrier Journal won two prizes in the 35th annual Jesse H. Neal Editorial Achievement Awards competition, sponsored by the Association of Business Publishers. Since 1982, CCJ has won nine Neal honors—more than any trucking industry publication.

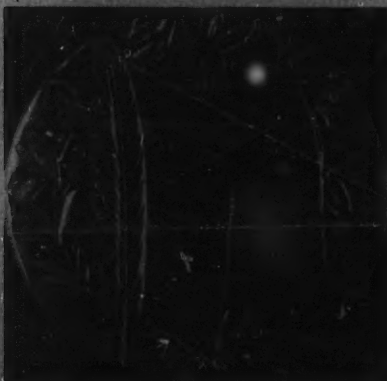
Winning entries in the 1988 competition were:

- A Neal award for a series of articles on drug screening written by Parry Desmond, executive editor. The series detailed each step required to establish a cost-effective, legally defensible drug testing program.

Part one provided basic information fleet management should know about drug testing. Part two discussed state drug testing laws. Part three explained how carriers can establish a rehabilitation program. And part four showed how one carrier's drug testing program saved the company money.

- A Certificate of Merit for Jerry Standley's editorials, which examined and commented on several controversial issues facing the industry.

The editorials: criticized an industry proposal to lower the driver age to 18; warned trucking companies about state drug testing laws; exposed the bias in a survey by the Regular Common Carrier Conference of the American Trucking Associations; and praised an industry attempt to improve truck accident reporting statistics. □



1988 Preliminary New Truck Retail Sales
(Including Imports of U.S. Manufacturers)

	CALENDAR YEAR		1988/1987 Percent Change
	1988	1987	
Class I	1,928,428	3,096,157	+6.9
Class II	1,333,171	1,175,080	+73.1
Class III	14,252	14,027	+1.7
Class IV*	21,191	2,129	+894.9
Class V	8,310	8,192	+1.5
Class VI	33,603	44,282	+23.0
Class VII	102,816	102,283	+0.5
Class VIII	147,749	131,156	+12.7
Total	4,607,042	4,173,545	+10.4

Source: Motor Vehicle Manufacturers Association

*The growth in sales of Class IV trucks was attributable to Ford Motor Co.'s new F-Series "Super Duty" model.

Consolidated Freightways plans to purchase Emery

Consolidated Freightways, Inc. and Emery Air Freight Corp. of Wilton, Conn., have signed a definitive merger agreement in which Consolidated Freightways will purchase all outstanding shares of Emery stock in a cash tender offer. The total purchase price is approximately \$230 million.

Larry R. Scott, president and chief executive officer of Consolidated Freightways Inc. said that, following the merger, operations of Emery and CF AirFreight will be merged, with the combined company operating under the name "Emery Worldwide, a CF Compa-

ny." The combined company will be headed by Donald G. Berger, current president of CF AirFreight.

Consolidated Freightways Inc., is a diversified transportation company with business in long-haul trucking, air freight, regional trucking and rail piggyback and ocean intermodal services. Revenues in 1988 were \$2.7 billion.

Emery Air Freight Corp. provides worldwide air courier/cargo service through an integrated courier/cargo system. The company reportedly lost \$17 million on revenue of almost \$1 billion in the first nine months of 1988. □

Highway users group studies smart highway technology

With research and development of future "smart highway" technology advancing rapidly overseas, the Highway Users Federation has formed a committee to assist U.S. efforts to catch up to its European and Japanese counterparts.

The Highway/Vehicle Technology Committee will ultimately help identify businesses and industries with a role in the research and development of smart highway technology and will help coordinate a free flow of information, according to the Highway Users Federation.

The most promising developments in "smart highway" technology are in computers in the car

and on the highway that monitor traffic conditions and plan optimal or alternate routes.

But systems are being developed that will keep the driver informed of his current location and allow automatic billing for toll road or parking facility use.

The largest intelligent vehicle project in the U.S. is the \$32-million Smart Corridor project in Southern California, which will begin in 1991. The locally-funded project will include monitoring traffic flow over a 12.3 mile segment of the Santa Monica Freeway, and then using changeable message signs to control vehicle movement and increase traffic capacity. □



The Business Outlook

...Cautious Optimism

Manufacturing recovery
"Continued economic growth, fairly stable interest rates, slow inflation and declining federal budgets and trade deficits." That's the U.S. Commerce's Department's basic forecast for the 1990s. One reason for those projected improvements is Commerce's forecast that the recovery of the U.S. manufacturing sector—most of which is at or near peak capacity—"is expected to continue over the long term."

Writing in the department's recently-published *Industrial Outlook 1989*, Dr. Christopher C. Barnekov of the Interstate Commerce Commission, was optimistic about trucking's long-term prospects. His analysis of the industry in the next decade included the following observations:

- Investment by all types of carriers in new, more efficient equipment—and their ability to acquire ready financing—"strongly suggests widespread confidence in the medium- to long-term future for intercity trucking, at least for efficient carriers."

- There will be "some upward pressure" on the rates of truckload (TL) and other nonunionized fleets. That "may increase LTL carriers' market share and the Teamsters' bargaining power somewhat. The spillover isn't likely to be strong enough to restore LTL volumes or Teamsters' wages (in real dollar terms) to their pre-1980 levels."

- Analysts estimate that \$20 billion to \$30 billion in additional annual transportation and logistics savings "may be attainable" by completing the economic deregulation of trucking, including removal of intrastate barriers.

Tonnage up

Adrian T. Dillon and James P. Meil, economists for Eaton Corp., Cleveland, Oh., noted in a recently-completed forecast: Federal deregulation produced a "nearly instantaneous 20% to 25% increase in average truck productivity due to elimination of 'gateway' cities, drastic reduction in empty back-hauls and increased competition

Continued

among truckers," resulting from price discounting.

But those factors also produced "roughly 20%" excess truck fleet capacity, according to the Eaton economists. That over-capacity reduced new heavy-truck sales in the 1980-'86 period by 19%, compared to replacement rates of 1974-'79. However, in the first half of the 1980s, truck tonnage was 14% higher than during the latter half of the 1970s.

While deregulation has had "an even more devastating impact" on the trucking industry than expected in 1982, continued the report, "the 'reindustrialization' of America, still in its early stages, has added even more stimulus to truck tonnage than we expected six years ago."

Lower fuel prices and just-in-time inventory policies also boosted trucking more than Eaton projected in 1982.

With tonnage "expected to outpace GNP growth by 0.5% to 1% annually over the next six years, and tonnage hauled to average 50% above the levels of the late 1970s, Eaton expects North American factory sales of Class 8 tractors "to approach the peaks" of the '70s.

The macro-economic assump-

tions Eaton used to develop its Class 8 sales forecast include:

- Real GNP growth will average about 2.8% annually, slightly above the 2.6% annual growth average of the 1980s to date.

- Consumer spending, which grew 3.4% annually from 1980-'88, will slow down to a 2.3% annual growth rate.

- Housing and nonresidential construction, which boomed during the first half of this decade, will decline over the next five years.

- Manufacturing and trade are expected to show substantially better growth in the half decade ahead. Trade is expected to add 0.7 percentage points, a 25% increase to average growth from 1988-'93. And industrial production, which rose only 2.4% annually in the decade to date, is forecast to increase 3.9% annually over the next six years.

The economists point out that intensity of truck use is four-to-seven times for a domestically-produced good for domestic consumption versus one-to-two times for an import and three-to-five times for U.S.-produced goods for export.

U.S. trade, however, "won't return to a balance before 1993,

when our cumulative debt burden with the rest of the world will reach roughly \$750 billion. Simply servicing the debt will require a trade surplus of \$50 billion annually in the 1990s." The surplus will come from the \$200 billion trade improvement that "will be generated from manufacturing." Thus, it's likely that manufacturing growth "will continue to exceed" that of the overall economy into the 1990s.

- Capital spending will be the major beneficiary of increased industrial strength, with equipment purchases—including trucks—projected to rise 6.8% annually.

Equipment replacement demand has been a diminishing factor in the Class 8 market, claims Eaton. The typical replacement cycle for "first use" tractors has been extended from six years in the 1960s to at least seven years today.

The reasons for the "dramatic changes" in the sources of economic growth are, say the Eaton economists, the sharply lower U.S. dollar and record productivity growth in manufacturing that have made the U.S. the "low-cost nation for high value-added manufacturing, and the accumulated foreign debt."

ANNUAL ECONOMIC GROWTH RATE BY REGION, 1986-1996

Region	Percent
1. South Atlantic	2.4
2. Mountain	2.1
3. New England	2.0
4. Mid-Atlantic	2.0
5. Pacific	1.8
6. West South Central	1.8
7. East North Central	1.7
8. East South Central	1.2
9. West North Central	1.2

Source: SPI International, Menlo Park, Calif.



Economic revival in 1991

Economic Consulting and Planning Inc. (ECAP), a New York City forecasting firm which is the former Merrill Lynch Econometrics Inc., also used an equipment orientation to make its predictions.

According to ECAP: "Outright weakness is expected to emerge as 1990 unfolds." That's why truck traffic and corporate profits "will falter, initiating a more conservative approach to equipment acquisition." However, the subsequent economic revival, beginning in 1991, "won't trigger" an immediate purchasing rebound, advises ECAP economists.

Underlying factors that "suggest continued strong sales" levels during the 1990-'93 period include, says ECAP: the "age and questionable condition of much of the truck fleet, enormous pressure on owners and users of trucks to improve service and efficiency and to lower costs, availability of a wide-range of new products, and the long-term expansion plans of key players in the for-hire carrier market."

"As evidence of a faltering economy mounts," continued ECAP, "orders for equipment will soften appreciably." Truck sales in 1990 will decline only by 2.5%, to 305,000 units. And sales will remain depressed as 1991 unfolds, despite a revival in economic activity, truck traffic and corporate profits. Modest improvement in

truck demand late in 1991 will do little to salvage the year as sales decline an additional 3.4% to 294,000 units.

Beyond 1991, ECAP predicts a "healthy increase" in equipment demand. In addition to non-economic factors, motor carrier traffic will grow, putting pressure on fleet owners to expand, "and we anticipate relatively robust growth in corporate profits."

Class 3 to 8 truck sales are forecasted to increase 3.8% in 1992 and 3.7% in 1993.

"The revival we anticipate late in the forecast period reflects improving economic fundamentals and mounting replacement pressure, as equipment purchased in the late

1970s is finally scrapped," concludes ECAP.

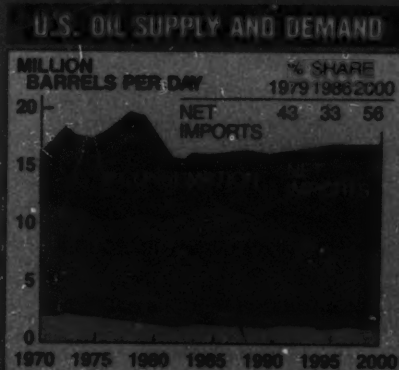
Trailer shipments "will remain sluggish" until traffic levels grow to the point where existing capacity is once again being strained and key buyers realize "substantial forward momentum" profits.

Van trailer shipments are slated to decline 3.6% to 124,100 units in 1990, says ECAP. "Weakness in construction and mining activity will contribute to a 6% drop in non-van trailer shipments." Trailer shipments for 1991 will decline 2% to 167,000. Beyond 1991, predicts ECAP, trailer shipments will "increase 6.8% in 1992 to 179,000 units and 5.9% in 1993 to 189,700 units." □

CLASS 8 TRUCK NORTH AMERICAN FACTORY SALES HISTORY AND OUTLOOK



Oil price outlook



Real oil prices on the world market will remain below \$20 per barrel until 1994, according to the most recent *Annual Energy Outlook*, published by the U.S. Department of Energy (DOE). "Thereafter, increasing world oil demand is expected to begin absorbing excess supply, so oil prices should then increase more rapidly—reaching \$31 (a barrel) by the year 2000," DOE says.

Total U.S. production in 2000 "is expected to drop from the 1987 level of about 8.3 million barrels per day to around 6 million. This reflects a more optimistic assessment of the future potential for older producing regions within the Lower 48 States," concludes DOE.

Declining oil production in the U.S., brought on by the 1986 oil price collapse, will continue, according to Chevron Corp.

"Higher development and producing costs associated with more mature U.S. oil fields make it difficult to reverse the declining domestic supply trend," says Chevron officials.

"Production from traditional producing states, such as Texas and Louisiana which were hit the hardest by the price decline, will continue to fall until oil prices begin to increase in the 1990s. By 1995, the rate of decline of U.S. supply is expected to stabilize at around 2% a year," says Chevron.



The Business Outlook

Who Will Haul The Freight

Impact of competition

Market research by a major tractor OEM shows that the following shifts in purchasing patterns of new Class 8 power equipment by various sectors in the trucking marketplace will occur in the mid-1990s as the industry's competitive environment changes:

- Reflective of the freight captured from private fleets by common carriers, purchases by for-hire carriers will grow from 23% in 1987 to 30.5%. And private carriers' current 33% share of new Class 8 purchases will shrink to 26%.
- Full-service lessors will increase their purchases from a 22% share in 1987 to 26%. That's because private carriers—the largest sector of the full-service customer base—will reduce the proportion of Class 8 tractors they own.
- Many TL carriers are switching to company-owned power equipment, so the proportion of tractors purchased by owner operators will decline from 17% to 12.5%.
- Purchasing volume for government fleets at all levels is ex-

pected to remain at the 5% level.

"There won't be a significant increase" in the amount of freight in the next decade, claims Joseph Devane, vice president of sales, Dorsey Trailers Inc., Elba, Ala.

Since the number of LTL fleets will decline, says Devane, the surviving carriers will capture more load volume. But there will be an increasing number of fleets chasing after a static amount of TL freight. Only the "safe, efficient TL carriers that offer superior customer service and differentiate themselves from the competition will succeed" in the fast-growing TL sector of the market, says Devane.

Trucking industry leaders interviewed all acknowledged that the consolidation of freight volume, revenues and profits by big LTL carriers, as noted in the "20-Year Analysis of The Top 100" (CCJ, July 1988) will continue into the 1990s. The article detailed how the leading LTL carriers—United Parcel Service, Yellow Freight, Consolidated Freightways and Road

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way Express—have captured an increasing share of revenues and profits over the past 20 years.

In 1968, the big four garnered 19.5% of the revenues and 31% of the profits shared by the Top 100 for-hire fleets. Last year, the four carriers increased their foothold on trucking with 40% of the Top 100's revenues and 48% of the profits.

For-hire vs. private fleets

John Throckmorton, consultant for A.T. Kearney, Chicago, says for-hire carriers will continue to capture freight from private fleets but at a slower pace. That's because private fleets are "leaner, more productive, better managed, and have an improved service orientation," claims Throckmorton.

He also believes the "cherry-picking" of private carriage's profitable freight by for-hires no longer exists. As a result, there will be a "5% annual growth rate" in the continued shift of traffic from private fleets to common carriers.

In the battle between the national and regional carriers for short- to medium-length hauls, Throckmorton adds, the reduction in the number of fleets used by shippers is having an impact in the LTL and the TL marketplaces.

"Shippers want the nationals to offer service levels provided by the regionals," he claims. "Someday, there will be mega-carriers offering a supermarket of services," but Throckmorton isn't sure that ship-

pers are ready for that scenario.

Also commenting on the competition between regional and national carriers was George Morris, a financial analyst with Prescott, Ball and Turben, a Cleveland brokerage. "The regionals will have to put up with the LTLs who are capturing short- to medium haul traffic through subsidiaries such as Consolidated Freightways' Conway Express and Roadway's Viking," noted Morris.

"The LTLs have the deep pockets and deep management, and the big, strong guys tend to win, no matter if it's trucking or baseball," observed Morris.

However, in the TL marketplace, says Morris, "only Builders Transport has captured much traffic from private fleets." Most other TL carriers only have grown through geographic expansion, he added.

Morris predicted a major shake-out when the long-expected recession happens in the coming years,

and "many TL fleets will be absorbed by the larger carriers."

Craig Kloner, a financial analyst for Goldman and Sachs Co., New York City, insists that "neither the amount of freight for-hire carriers capture over the next 10 years, nor the health of the economy, will have any impact on the number of trucks in private fleets." Kloner insists that the number of trucks in the private carriage sector will remain "absolutely" at the same level in the next decade as it is today.

"Following the deregulation of trucking, there was a big fallout of private carriers when the freight rates dropped," says Randy Dennis, Navistar's general manager-heavy duty-products.

However, adds Dennis, "today's private carriers have found their fleets provide economic service or promotional advantages. As a result, I don't see a major shift occurring from the remaining private carriers to the for-hire sector." □

HEAVY TRUCKS' PROJECTED PRODUCTIVITY CHANGES, 1968-1996

	1968	1987	1996
Capacity (tons)	24.2	27.7	28.0
Load factor (percent)	57.9	67.1	68.9
Speed (mph)	41.2	46.4	48.5
Hours moving a year	1,723	1,742	1,899
Annual density-adjusted ton-miles	823,507	1,206,573	1,317,104

Source: SRI International, Menlo Park, Calif.



A.T. Kearney's John Throckmorton says for-hire carriers like Matlack will continue to capture loads from private fleets.



Craig Kloner, Goldman Sachs Co., says the number of trucks in private fleets "absolutely" will remain at the current level.

Intermodally Speaking

"Rail" means intermodal, a point that has been overlooked almost for its own sake. Observers of the U.S. rail industry and the American Trucking Association (ATA) are generally agreed that intermodal freight is a major business. But the two sides cannot agree on what that means. Rail's point is that intermodal is the use of rail for the entire haul.

Intermodal is the movement of freight on a truck trailer or a similar container, etc. at least two modes of transportation.

To substantiate the argument against intermodalism, container use has risen with the business. Container Commission, Vol. 1, Freight's Role in the Nation, 1962, to 1974, shows that in 1962, 11.4 million units were in use, and Freight's Role, Vol. 2, 1974, shows that the number had advanced to 22 million units in 1974, to 42.7 million units in 1976.

Although the container has facilitated freight flow, it has not created opportunities for rail's growth. The growth has come from the fact that the container is for a wider range of cargo, making up an increasing percentage of the total tonnage of the rail box cars.

U.S. railroads find intermodalism attractive because it helps solve their shortage of freight trailers and containers, according to MacLeod.

David Wagner, president of the Trucking Co., Philadelphia, thinks the big lift has given their intermodal business because they are limited in the number of new trailers they can take on despite their efforts to build. Their new business is doing so well, says Wagner.

Granted, increased intermodal volume reported by one major player in the U.S. sector of the trucking business does not signify a revolution. But the data and comments noted below demonstrate that intermodalism is a growing trend to watch in the 1980s.

According to the National U.S. Association of Manufacturers, the number of trucks and trailers moved on flat now annually has increased about 150% over the past 20 years. In 1968, U.S. railroads handled 2.2 million intermodal units. The figure for 1980 was projected to be ap-

proximately 4.5 million units, says the association.

ATA says that the number of double-stack units moved in 1976 increased over 1975, and more than twice the 1970 double-stack volume. Double-stack units reported nearly 10% of

Continued



Conrail's intermodal volume, according to Conrail officials.

• "Since piggyback was fully deregulated in 1981, intermodal car loadings have grown at an average annual 8.9% rate, up sharply from the 3.4% growth rate from 1967 to 1980," wrote analyst Stephen Klein in Standard & Poor's Sept. 22, 1988 *Industry Survey*.

However, adds Klein, much of intermodal's growth stems from the diversion of freight from railroads' boxcar service to trailers-on-flatcars (TOFC). "TOFC has doomed the boxcar to extinction since shippers prefer moving merchandise by railroad, dock-to-dock, in a single trailer: handling costs are lower and the risk of lost or damaged freight is reduced."

Piggyback grew to 15% of rail car loadings in 1987 from less than 1% in the mid-1950s, continues Klein. "Approximately 40% of piggyback loads are thought to be international container movements."

Despite that rosy picture, many truckers are reluctant to discuss how much intermodal work they're doing. According to industry sources, that's because some shippers are paying higher truck rates for freight that's being moved via rail. And some shippers "have long memories" of when they were burned 15 to 20 years ago when intermodalism started, because of lots of big damage claims, says McQuaid. Some are queasy about having their product move by rail because they think rail movements create damage claims and slow delivery problems.

But Kenneth Maxfield, president of North American Van Lines, told attendees at an intermodal session at the 1988 ATA Management Conference that his company's intermodal rail claims experience doesn't compare to those of 15 to 20 years ago. Anyway, added Maxfield, profits generated by using rail in lieu of trucking makes the claims risk worthwhile.

Maxfield said the rails' 99% on-time performance is superior to the truck sector's. He also noted that rail doesn't have to contend with breakdowns or weather problems, as truckers do.

MODAL SHARES OF U.S. FREIGHT

	Percent by Mode		1987-1996 Growth Rate
	1987	1996	(percent)
Short-haul truck	6.5	6.9	2.7
Long-haul truck	26.9	28.1	2.4
Total truck	33.4	35.0	
Rail	29.4	29.1	1.8
Pipeline	24.2	22.2	0.9
Water	13.0	13.7	2.4
Total	100.0	100.0	1.9

Source: SRI International, Menlo Park, Calif.

Initially, double-stack trains were used solely to move to and from ports. But now they also criss-cross the country, almost doubling rail productivity with each movement.

New options

Examples of new intermodal rail options that are attracting freight formerly handled by rail include:

- a 76-hour dedicated train from New York to California, operated by Conrail in cooperation with the Santa Fe Railroad. Much of this "premium service" train is now being used by UPS and the U.S. Postal System. But Conrail also has expanded the service to capture less-than-truckload traffic and other time-sensitive freight.

- many overnight rail movements. For example, a Safeway distribution manager based in Phoenix is receiving 50 to 60 rail cars weekly from Los Angeles. That traffic was formerly handled by truck.

After Safeway power equipment picks up the containers from the Santa Fe rail yard and transports them to the Safeway warehouse, the supermarket chain has free use of the containers for five days. And they are unloaded at Safeway's convenience without paying the spotting fee usually applied by carriers for customers holding trailers. Safeway often unloads a unit one day, then uses the container for deliveries to some of its stores in his district and then pulls the container to a shipper to

pick up a backhaul for the railroad.

- according to North American Van Lines' Maxfield, his company and his major competitors are using rail to handle the peak summer season traffic, when moving company volume doubles from 2,000 to 4,000 loads a week. This is an owner operator business, and household goods movers can't come up with a bunch of extra drivers to handle the increased seasonal traffic.

The explosion of trade with other nations has fostered the growth of intermodalism.

Over the past two decades, much off-shore manufacturing centered in Japan, Korea, Taiwan, Hong Kong and, more recently, the Philippines. Goods produced in the Orient used to be shipped by vessel via the Panama Canal to reach North Atlantic ports in the U.S. and the rich East Coast markets.

In the early 1970s, however, ships with goods produced in the Far East began docking in increasing numbers at Pacific Northwest and California ports. Their containers were then railed to the East Coast. Use of this land-bridge option cut transit time from the Orient to New York by as

much as two weeks. And steamship lines were able to increase the productivity of their ships.

By 1980, more steamship lines had adopted this practice, which accelerated the coast-to-coast double-stack train service in 1984.

The weakening of the dollar and the re-industrialization of America has allowed U.S. manufacturers to rebound and increase exporting. But that change should only create some shifts in traffic patterns of intermodal movements, not total volume, according to the U.S. Commerce Department.

Two factors that have enhanced the growth are double-stack trains and electronic data interchange (EDI).

Steamship lines created double-stack trains—containers stacked two-high on a chassis. Initially, use of double-stacks was essentially limited to moving imports inland, west to east. But their real potential lies in domestic traffic. Currently, double-stack service

holds just 11% of the intermodal market, but its share might reach "15% by the early 1990s," predicts S&P's Klein.

EDI has been widely adopted by the shipping and rail industries. On Conrail, EDI provides shippers with instant status reports on shipments through their own computers, via Conrail's voice-activated telephone tracing system or through the third party EDI network.

The downside

If intermodalism is to have a major impact on commercial transportation in the decades ahead, several problems must be addressed. They include:

- Many shippers say the railroads haven't acquired enough of the 48-ft-long trailers truckers prefer for highway movements. But rails claim that most 40-ft-long trailers weigh out.

Michael Bruns, president of Comtrak, a Memphis-based carrier that provides both drayage and TL fleet

service, claims the numerous options—double-stacks, 42-ft and 53-ft-long cars—have generated "a reluctance among railroaders to order new equipment. They are waiting to see what the ultimate state-of-the-art will be. In the meantime, the old cars are starting to wear out, and they're not being replace."

- Without labor cost reductions, piggyback service can't begin to compete effectively with TL carriers for hauls of less than 800 miles, says S&P's Klein. Consequently, the average intermodal haul is 1,150 miles, versus about 500 miles for typical TL movements.

While the typical rail operating crew consists of four persons, adds Klein, the rail unions have allowed piggyback trains to use two-person crews in certain instances. The crew-size exception has allowed Southern Pacific, for example, to capture short-haul traffic formerly handled by truck.

With double-stacks, the linehaul saving advantage is "about 60% over conventional TOFC because the same labor input is spread over twice as much freight," according to Klein. Those savings are negated by heavier terminal, handling and drayage expenses for double-stacks, cutting the cost advantage by about half.

However, economist Brian Freeman wrote in a report for the Railway Labor Executives' Association: "Labor costs are neither the primary cause nor even a substantial cause of the rail industry's current situation, nor are they its salvation."

Freeman argued that railroads are treating their operations as "cash cows," using the funds generated from rail operations to diversify into non-railroad ventures.

If the industry had an opportunity, it wouldn't reinvest labor-cost savings in rail operations, said Freeman. Instead, the savings would be siphoned to non-rail investments with potential for higher returns.

"On average, rail employees are at or below market wages for jobs that involve comparable skills and working conditions," concluded Freeman.



Currently, double-stack service holds just 11% of the intermodal market, but its share might reach "15% by the early 1990s," according to Standard and Poor's Stephen Klein.



Government Factors

The "Decade Of Uniformity"

If just a few current efforts succeed in creating greater standardization of interstate rules and regulations, the 1990s could become the decade of uniformity for the trucking industry.

State regulators have realized they can save billions by establishing common bureaucracies for registering, taxing and governing the trucking industry. And the centralized systems will save carriers billions in administrative and compliance costs.

By the middle of the next decade, nearly every state is expected to belong to the International Registration Plan, a reciprocal program for registering interstate motor carriers.

Industry sources predict more than half of the states will be members of the International Fuel Tax Agreement, a cooperative for distributing fuel taxes to states where trucking companies have operated.

While Congress has opted to allow states to develop improvements in state economic regula-

tions, the federal government has begun considering preemptions to state safety regulations. The Motor Carrier Safety Act of 1984 requires the Federal Highway Administration to study state safety regulations that may pose undue costs or hardships for interstate carriers.

Specifically, FHWA was ordered to review state laws affecting interstate motor carriers, and then notify states of regulations conflicting with federal law. The review is a first step toward uniform regulations nationwide for the industry.

As a first step toward complying with the mandate, a 15-member panel of industry, consumer, labor and safety representatives recently reviewed every state regulation affecting the operation of interstate trucking. The panel was ordered to identify state regulations that were incompatible with existing federal regulations.

4,380 prospects for preemption

In order to review 73,000 regulations, the FHWA paid a contractor

Continued



Government Factors

\$500,000 to collect and enter each of the state laws into a data base. The result—a 4-ft high printout of every state law affecting interstate motor carriage.

Using a computerized system, the FHWA panel initially determined that more than 29,000 state regulations were incompatible with federal law. Of the 73,000 regulations adopted by the states, 34% were less stringent than comparable federal regulations and 6% were more stringent. Nearly 17% had no comparable federal law or affected intrastate carriers only, and 43% were essentially the same as federal.

Focusing on incompatible rules, the panel quickly discovered a pattern in the differences between the state and federal regulations. For the most part, the less stringent state regulations provided "singular exemptions" for certain types or classes of carriers. For example, many states exclude private carriers from certain motor carrier regulations.

In other cases, the regulations were less stringent because the states adopted the entire federal code affecting motor carriers, but failed to update their regulations as the federal code was changed.

Panel members don't expect the states to balk if asked to beef up or update these less stringent regulations to comply with the federal standards. That leaves the panel to rectify the 6% of the state regulations—roughly 4,380—that are more stringent than comparable federal laws.

Congress mandated that states with more stringent rules must adopt federal standards unless the state can demonstrate that the stricter rule provides additional safety benefits and does not add undue costs to interstate motor carriers.



Aiming to eliminate bottlenecks at weigh stations, like the one shown above, federal and state initiatives will streamline state laws and regulations, thereby reducing productivity barriers to efficient trucking.

"It's tough to prove or disprove safety benefits," said Joe Toole, who is managing the project for the FHWA.

The panel's findings are currently being provided to governors in each state for their comments. Depending on the governors' responses, the panel then will forward a recommendation through the Secretary of Transportation back to Congress on whether preemption is called for in order to resolve the conflict in regulations.

Uniform safety regulations

The decision to preempt state safety regulations that conflict with federal regulations is scheduled to be considered by 1991. Based on the governors' responses, the DOT Secretary will make recommendations to Congress at that time.

Once uniform regulations and procedures are developed, the federal and state governments will be-

gin trying to establish uniform enforcement standards. They won't have to look farther than their Motor Carrier Safety Assistance Program.

The MCSAP network was formed to administer federal funds used for state motor carrier enforcement efforts. Interaction among the dozens of state MCSAP coordinators can "fill the voids and provide oversight" as states progress toward uniform regulations and enforcement procedures, Toole said.

In the truck inspection arena, efforts by MCSAP and the Commercial Vehicle Safety Alliance have led to a uniform inspection criteria for placing vehicles out of service, and for auditing motor carrier operations and safety efforts.

This year more than 1.5 million roadside truck inspections will be completed, primarily by state and local regulators.

By adopting uniform procedures and guidelines, the message that

MCSAP and CVSA are sending out is "there is one unified motor carrier safety program managed by federal, state and local governments," said John Hibbs of the Federal Highway Administration.

The combined efforts also are improving state and federal efforts to inspect carriers' operations. Through late 1988, 125,000 of the estimated 180,000 carriers in the U.S. had not been audited.

While state officials through

MCSAP completed 25,000 audits this year, the FHWA identified 20,000 carriers it was unaware of, giving the auditors a net gain of 5,000 audits this year. More than 13,000 carriers were identified because they called to request a census number.

During the audits, 10% of the carriers were rated unsatisfactory and 35% received conditional safety ratings. The safety ratings will affect insurance rates and shipper

decisions to use a carrier, Hibbs said.

In the future, local governments will be asked to join the audit efforts, and by 1993 state and local governments will conduct all initial safety audits, FHWA will follow up unsatisfactory and conditional ratings with carrier reviews.

While the cooperative state efforts will save interstate carriers billions in administrative costs, the new-found uniformity also may yield some political benefits for states trying to retain their privilege to regulate trucking economically.

In many states, the truck inspection criteria adopted for interstate carriers will be adapted for the intrastate carriers. Few states will expect enforcement officials to maintain two "rule books" for trucking companies.

A "win-win" situation

As state officials begin working together on uniform regulations, some also are finding ways to reduce the bureaucracy that tracks truck registrations and mileage to collect taxes.

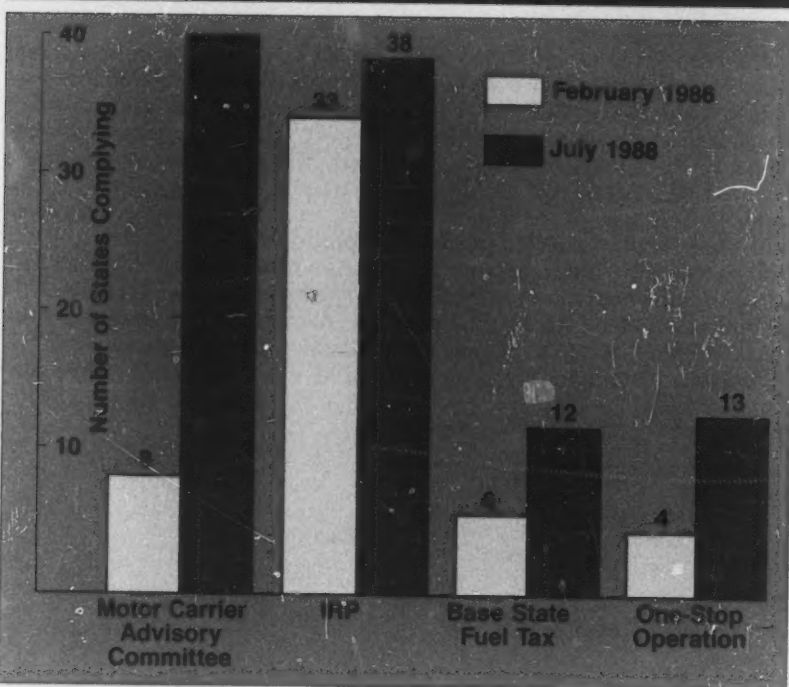
As a result, truckers in the late 1990s will be able to travel more efficiently into and out of those states in the West that will share ports of entry. Arizona and Utah are breaking ground on the first joint port this spring, and Arizona expects to open five such ports shared with neighboring states.

The shared ports will be good for trucking, because it will make travel more efficient and improve the uniformity of procedures among states.

The shared facilities also help the states reduce administrative costs in the coming decade. State attorney generals are still working on questions of liability and juris-

Continued

STATE PROGRESS COMPLYING WITH CONSENSUS AGENDA RECOMMENDATIONS



While never soon enough, this chart shows good progress against objectives in a four point NGA effort to improve uniformity of state procedures. In 1986 the National Governor's Association endorsed four recommendations to simplify motor carrier tax collections. The NGA first established Motor Carrier Advisory Committees in each state, consisting of representatives from state agencies having motor carrier programs and all segments of the motor carrier industry. The plan was to develop simple, uniform registration and taxation procedures for trucks and buses. The second goal involved the International Registration Plan (IRP). The IRP allows motor carriers to travel in member states with one IRP license plate and cab card. The home state collects registration fees due all states, and distributes those fees to the other states. The third objective was to simplify the fuel use tax reporting system. Two base-state fuel use tax agreements exist, the International Fuel Tax Agreement (IFTA) and the Regional Fuel Tax Agreement (RFTA). Under each, motor carriers register with and report their fuel use to their home state, display a single decal and carry a single cab card. Instituting a simple "one-stop shopping" office for motor carriers was NGA's fourth objective. This would establish a single office in each state where motor carriers can directly apply and receive all required credentials and pay taxes.



Government Factors

diction. States still must resolve questions dealing with truck inspection and enforcement based on conflicting regulations.

In addition to becoming uniform, truck inspections will become more tolerable for truckers in the 1990s. The Commercial Vehicle Safety Alliance has become a forum for sharing concepts in commercial vehicle enforcement, including ideas for improved inspection sites.

Oregon weighmaster Doug Gylenskog sparked interest in his state's indoor inspection facilities, which have increased inspection productivity by 40%. The facilities incorporate ideas gleaned from California facilities that feature in-floor lighting.

The improved facilities reduce tension among drivers by providing a more professional atmosphere for the inspection. Drivers put out of service also have a more comfortable facility with rest rooms and food available while waiting for repairs.

Accident data at a bargain

While federal and state regulators push for uniform regulations that will streamline tax collection and, potentially, save the trucking industry billions, truckers may get more than they bargained for—accurate data on the causes and effects of truck accidents.

Since the invention of the automobile and the advent of the truck, highway accident statistics have never accurately portrayed the extent of property damage, injuries and deaths linked to accidents involving heavy trucks.

"There is no national data base that provides reliable, uniform, comprehensive information" on truck involvement in highway accidents, said Ralph Craft, motor carrier projects manager for the

OUT-OF-SERVICE RATE PER INSPECTIONS

	INSPECTIONS	VEHICLES O-O-S*	DRIVERS O-O-S*
84	158,730	49,804	9,273
85	373,374	107,583	23,695
86	559,300	218,144	43,117
87	1,003,794	368,188	57,654
88	1,200,000 (projected)	400,000 (pro)	61,000 (pro)
89	1,500,000 (projected)	500,000 (pro)	68,000 (pro)

*Out-Of-Service

While the number of truck inspections has risen each year as more states join the MCSAP program, the number of out-of-service vehicles and drivers as a percentage of inspections remained constant. Federal officials expect that trend to continue in the 1990s. The 1988 and 1989 numbers are projections from DOT and CCI.

National Governors' Association.

The problem is compounded by lack of communication between state bureaucracies, different levels of training among police officers and difficulties in obtaining detailed data from the accident scene.

In general, 10% to 20% of all accident reports are filed by state police. The remainder are filed by local police, who tend to lack the detailed training of state troopers, Craft said.

Budget constraints also hamper efforts to obtain accurate accident information. Preparing accident reports is not a top priority of police already facing a burgeoning workload, and funding is not available to train state and local police officers on the intricacies of accident reporting.

As a result, federal accident data is spotty and incomplete. The Department of Transportation's Fatal Accident Record System (FARS) is based on incomplete and incom-



patible state records, and does not capture nonfatal accident statistics.

The broader National Accident Safety Survey (NASS) is a compilation of randomly selected accidents. Statistics generated by the NASS data are based on a small sample of total highway accidents, and typically include few accidents involving trucks.

And Motor Carrier Safety Management Information System data, based on federal MCS 50T reports, is incomplete and under-reports accidents.

The effort to compile an accurate picture of truck accidents by independent researchers, such as the University of Michigan Transportation Research Institute, are hampered by the incomplete data. UMTRI studies, for example, are based on FARS and the MCS 50T reports.

As a step toward uniform reports, the NGA formed a technical advisory group to determine the type of information that should be reported. The group also simplified the method for determining if an accident is reportable.

The old method required a dollar estimate of damage to the vehicles, something difficult to estimate with any consistency. Under the NGA system, an accident is reportable if there was an injury, fatality within 30 days or one of the vehicles involved had to be towed away from the scene.

The group developed a report form with 13 data elements and a proposed two-tiered accident investigation strategy. The 13 data elements cover the basic details of the accident, including road condition, driver condition, vehicles involved, road configuration.

Collecting information on each of these 13 data elements is the first tier of the reporting system.

The second tier involves collecting more detailed information to study accident causes and try to uncover patterns linking accidents to more detailed factors such as type of carrier and type of load.

Accidents would be selected randomly for further investigation by a more experienced accident investigator, and these results would supplement the basic data collection efforts.

A pilot study in five states ended Sept. 30, and NGA is analyzing the

results. The study compiled 3,800 accident reports on the new NGA forms, and surveyed officers individually and in focus groups to determine their reactions to the form. The study was conducted in Illinois, Michigan, Minnesota, Ohio and Wisconsin.

NGA will develop a policy statement on adopting the forms at its Winter meeting in 1989, possibly leading to the first national, uniform truck/bus accident reporting system early in the 1990s. □

The Right To Tax

"The governors will, of course, fight any attempts by the federal government to preempt state taxation procedures," said Ralph Craft, National Governors Association motor carrier project manager, in a speech late last year.

To retain their traditional rights of taxing motor carriers, the NGA is pushing a consensus agenda, calling on states to join base-state fuel tax agreements and the International Registration Plan, establish motor carrier advisory committees and open one-stop registration centers.

In return for the simplified procedures, states should not be preempted by Congress from regulating carriers, according to the NGA agenda.

"But we will not be able to successfully defend the states [in Congressional hearings] if the industry brings in pictures of credential laden trucks" or mounds of paper required to obtain those permits, Craft said.

The states' efforts will demonstrate a commitment to reducing the bureaucratic maze facing truckers. "We cannot expect to be taken seriously [in Congressional hearings] if we cite as progress the reduction of required truck credentials from 107 to 100," Craft said.

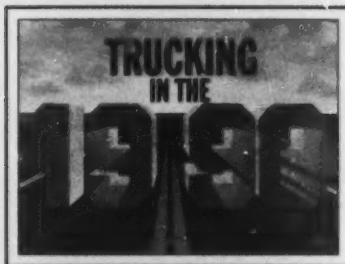
Programs Hit Paydirt

In addition to promoting uniform regulations, the FHWA has funded several programs expected to improve highway safety in the 1990s. In Wisconsin, a study noted that inspectors' increasing familiarity with log books is raising the number of drivers put out of service.

Officials in Illinois and Oklahoma have developed successful drug interdiction programs. Oklahoma MCSAP officials used part of a \$1.25 million drug enforcement assistance fund to set up a drug program recently credited with nabbing a truckload of marijuana worth \$1 million. And states have learned to coordinate efforts by running joint "sweeps" or concentrated inspection efforts.

Connecticut worked on a procedure for verifying that repairs were made to inspected vehicles with defects.

Utah has published a MCSAP newsletter to promote communication and share ideas among state officials. Arkansas developed a carrier education program. Idaho, Montana and Indiana also are reporting that accidents are down since MCSAP was put in place, and that is the top objective of the MCSAP program, Hibbs said.



Equipment Considerations

The Cab & Chassis

“We must not lose sight of the cost effectiveness of technological advances,” said Keith Lewis, executive engineer, Ford Heavy Truck Design, at a recent Society of Automotive Engineers meeting. Since it takes time for new technologies and designs to be proven cost effective, changes will be slow and incremental; evolutionary rather than revolutionary.

Here's a look at some evolutionary insights that you probably will consider as you anticipate purchasing equipment within the next few years.

Configuration

“We'll see broader use of multiple trailer combinations and set-back front axle tractors will predominate.”

That's Peter Wolsdorf, vice president, engineering, Freightliner, who believes proposed legislation to allow higher vehicle weights will eventually be approved, but individual axle weights will not increase.

Brian Wheeler is product plan-

ning manager at Volvo GM Heavy Truck Corp., Greensboro, N.C. He expects to see increased use of high cabovers. “There are two reasons for this. First, design changes to the high COE will remove some objections to its use. Second, the 53-ft semi-trailer is gaining in popularity.

“High-COE sales reached 41% of the Class 8 market during 1982,” he adds, “and steadily declined to 17% in 1987. We expect this trend to reverse with sales reaching approximately 22% in 1992.”

“In order to retain profitability,” says Wheeler, “many less-than-truckload carriers have changed to a hub-and-spoke, short-haul type of distribution system. This strategy favors a trend to a nonsleeper, conventional, low-cost tractor which can, on occasion, be used for long haul between hubs.”

On the other hand, Freightliner's Wolsdorf maintains, efforts to cut corners on linehaul tractors may be offset by the alleged driver shortage, which is inducing some motor

Continued



Equipment Considerations

carriers to provide more amenities to attract and retain drivers.

Drivetrains and synlubes

Radical change is unlikely in transmissions, drivelines and rear axles for at least a few years. For instance, synchronized gearboxes, though widely enjoyed in Europe, are not likely to make significant inroads in the U.S. heavy truck market. The reason, according to Tom Dickson, director of technical activity, Dana Corp: "For a synchro transmission to reliably handle the same amount of torque as a nonsynchro unit, it has to be larger, heavier and more expensive."

Likewise, automatic and automated transmissions pose no immediate threat to nonsynchronized, manual gearboxes, at least in heavy-duty applications. Medium-duty, however, could be a different story.

"I think we'll see more automatics there," says Dean Stanley, Navistar's vice president of engineering. "With a shortage of drivers, you're going to



This Mitsubishi Fuso MT-90X "truck of the near future" illustrates the increasing evolution toward factory-integrated aerodynamics, with less added on by users or dealers. Mitsubishi claims MT-90X has a drag coefficient of 0.38.

have an unskilled pool from which to choose. An automatic in a stop-and-go operation will save the transmission and make the engine do what you want it to."

Also, niches like refuse work—traditionally well-served by automatics—will persist. Bob Denes, Eaton's general manager, Drivetrain Systems Div., predicts that use of automatic and automated transmissions will increase. He also cites advantages of automated compared to automatic transmissions.

Expected to be available in the U.S. within a few years,

automated transmissions are unlike conventional automatics in that one does not use a torque converter or planetary gear sets. It is essentially a manual transmission that uses electronics and pneumatic valves and slave cylinders to do the work of shifting and clutch engagement/disengagement.

To a driver, an automated transmission feels like a conventional automatic but with some advantages. According to Denes, advantages include less heat, eliminating the need for a transmission cooler in a vehicle's radiator; more available gear ratios than conventional automatics; and parts commonality with manual gearboxes.

Apart from taller gear ratios needed to accommodate smaller-diameter, low-profile tires, not much will change in drive axle design or configuration. Despite the popularity of single drive axles in Europe, the tandem will remain popular on this side of the pond.

"Tandems show no signs of diminishing in favor of single rear axles," says Freightliner's Wols-

dorf. "Except where doubles combinations replace the traditional five-axle tractor-trailer. With the potential of higher gross weights being allowed, tandem axles will remain strong."

Although transmission and drive axle design won't change much, lubricants used in them will increasingly shift from mineral-based to synthetic. According to Joseph Mann, manager, vehicle engineering for Navistar: "The future will see axles and transmissions with a factory-fill of synthetic lubricant."

The once-questionable benefits of synthetic lubricants, in time, have become well-documented. They are more stable and less prone to oxidation and breakdown at high temperatures and offer improved cold starting capability. Thus, synthetic lubes keep internal parts cleaner and reduce wear rates.

They may also provide modest increases in fuel economy and allow extended drain intervals.

Many users have questioned the value of synthetic engine oils, since they're expensive and, in engines, make-up oil is a big factor. But there is little doubt that synthetic gear lubes are cost efficient.

Jim Cade, manager-maintenance/technical for Ryder, has been using synthetic lube in transmissions and drive axles. "We've extended our drain intervals from 100,000 miles to life [500,000 to 600,000 miles]," Cade told CCJ. "The axles and gearboxes run cooler and exhibit no more wear at teardown than those run on mineral lubes and drained every 100,000 miles."

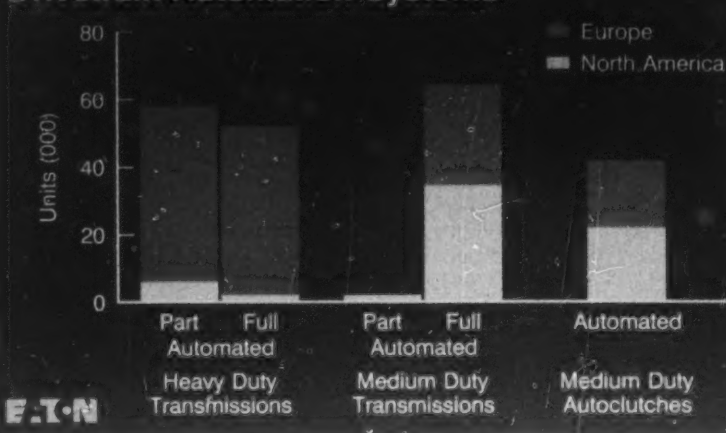
Since reduced maintenance requirements and improved component longevity are key factors in reducing the bottom line, synthetic gear lubes appear to be a shoo-in.



Drive pinion from Rockwell SQHD rear, after 196,000 miles on original fill (after break-in) of synthetic gear lube. Transmissions and axles will be factory-filled with synthetic lubes by mid '90s.

"Mature Year" Forecast (Units)

Drivetrain Automation Systems



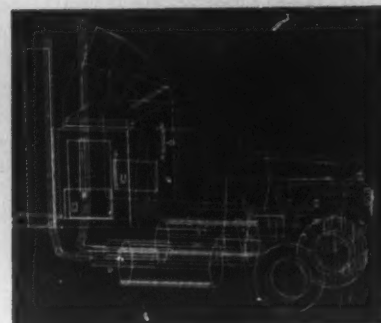
"Although it's impossible to pinpoint," says Bob Denes, general manager, Eaton Drivetrain Systems Div., by the late '90s or early 2000s, the fully automated transmission could reach product maturity (sales curves flatten out). Sales could top 60,000 units annually in the medium-duty segment, more than half of those for North American users. By contrast, automated penetration into the heavy-duty segment will be slight.

Cab, corrosion, driver environment

Many say the cab of the '90s is pretty much here, but at least one manufacturer is saying: "You ain't seen nothing yet."

Aerodynamic bodywork has conclusively shown its value in increasing fuel economy and reducing splash and spray. Major advances in this area have already been made. Over the next few years, look for fine tuning—like

Continued





Equipment Considerations

airflow management to keep lights and mirrors clear, to cool brakes, transmissions and axles, and to reduce crosswind effects.

As more miles are logged, and as the science of truck aerodynamics becomes more precise, look for air dams, roof and side fairings, to become more integrated at the OEM level, and less often added-on by operators and dealers.

Although a totally corrosion-proof cab is an elusive dream, cabs are being made ever more resistant to corrosion.

"When it comes to using exotic, corrosion-resistant materials, trucks are already well ahead of passenger cars," asserts Navistar's Stanley. "We've been using aluminum extensively for years, and sheet-molded compound is now common on trucks. These materials, as well as steel, will persist over the coming years."

Improvements in occupant protection will include upgraded restraint systems, such as standard 3-point safety belts and air bags, and standards for injury-producing parts within the cab, as well as for cab integrity.

"Users are asking for the inviolability of the occupant's survival space in crashes and fires," says Volvo GM's Wheeler. "Interior materials having minimum fire risk will be included, being difficult to ignite and self-extinguishing."

"Drivers deserve a better shake in tomorrow's truck," maintains Ed Mabley, manager of heavy truck product development at Ford. "And they are going to get it." Mabley cites diverse improvements available for drivers in the coming years, including:

- roomier work space;
- smoother ride;
- more responsive steering, handling and braking;



Tom Brooke, president of Frederick Transport, led the first carrier launch into satellite operations with Sony Wayfarer hardware and Geostar linkup. By the 1990s, this innovative and bold communications strategy may become commonplace as more and more shippers urge the increasingly competitive long-haul carriers to make the investment in satellite operations in order to keep their business.

- better steps and handles;
- improved visibility through larger windows, better mirrors, and possibly even remote TV and proximity devices;
- lower interior noise levels.

This last quality of future cab design may be aided by the burgeoning science of electronic noise attenuation. Technology is available to produce "anti-noise" that's capable of quieting any loud, repetitive sound—like that made by a diesel engine (Would you believe an electronic muffler?, CCJ, July '88, page 76).

Noise Cancellation Technologies Inc., Great Neck, N.Y., has announced that its "SilentSeat"—a seat with built-in speakers that broadcast anti-noise—will be available for heavy trucks later this year.

Electronics

Vehicle tracking and recording

devices will see more widespread use in the '90s, providing management with real-time information about vehicle location and operation. It's likely that they will also become more of a driver's friend, providing weather information and, perhaps, even up-to-the-minute height measurements of upcoming bridges (How high is that bridge ahead?, CCJ, August '88, page 33).

"We think that on-board recorders and satellite communication devices will be common by the end of the '90s," says Freightliner's Wolsdorf. "These may also include such devices as active suspensions and automatic tax reporting for weight in motion. Traffic control devices on the highways and in cities, for smoothing traffic flow, and electronic navigation devices will be in general use."

Instruments and controls will be designed and laid out with utility

the foremost consideration, following TMC recommendations for configuration and placement. The customer preference for analog gauges over electronic/digital clusters is expected to continue. Freightliner's Wolsdorf notes: "The electronic dashes we have seen so far have not provided enough value for the customer to be widely accepted."

Drivers likely will soon employ electronic anti-lock brake systems (ABS) and wheel-spin controls. Many government soothsayers believe ABS will be mandated by the mid-1990s, but the legislation is not expected to recreate the problems of the '70s.

New anti-lock systems have already demonstrated their superiority to earlier equipment. Advances in digital electronics, improved resistance to electromagnetic and radio-frequency interference and better environmental insulation have gone a long way toward ensuring durability and reliability in today's anti-lock sys-

tems (Getting ready for anti-lock, CCJ, Jan. '89).

According to Ford's Mabley, steering also will benefit from the electronic revolution. Speed-sensing steering (sometimes referred to as variable-assist) like that found on some late-model passenger cars, will increase steering effort on the Interstate for better high-speed road feel, but deliver more power assist at lower speeds in the city, for better maneuverability. And it's just around the corner on heavy trucks, Mabley said.

Electronic devices like electronic engine computers, driveline controls, anti-lock systems, trip recorders and satellite communication devices will have the ability to communicate with each other and with remote devices, thanks to the establishment of SAE Standards J1708 and J1587. These define data "language" standards for microprocessor-based vehicle systems. They also will ultimately afford the capability of diagnosing various systems, regardless of brand, with

a single tester, through a standard, off-board diagnostic connector.

"We'll see more standardization in diagnostics," says Freightliner's Wolsdorf, "as was recently announced by Freightliner, in conjunction with Caterpillar, Cummins and Ryder (see CCJ, Jan. '89, page 9)."

Most electronic devices will have some degree of self-diagnostic capability, adds Wolsdorf, "And they will also assist in diagnosing other vehicle problems. Components will be of a remove-and-replace nature."

Navistar's Stanley believes multiplexing in common electrical systems (lighting, for example) is coming. In such applications, control signals for a number of different loads could be carried along a single wire or fiber optic strand, eliminating the weight and complexity of multiple wiring harnesses. "It will come slowly, driven from the passenger car base," says Stanley. "We'll probably see some small form of it in the '90s."

Clearly, those who work on this equipment will need to be highly trained with advanced skills in diagnostics—both mechanical and electronic.

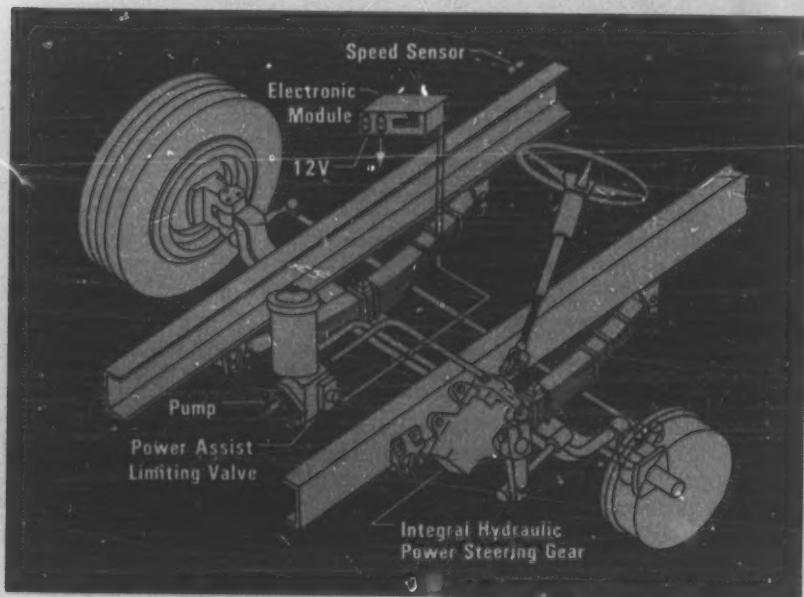
"This will place a huge responsibility upon manufacturers, dealer organizations and fleets, to train and retrain a new breed of maintenance personnel," says Ford's Mabley.

"Technology will lead us to improved equipment output, but there is already a price to be paid in the need for competent maintenance."

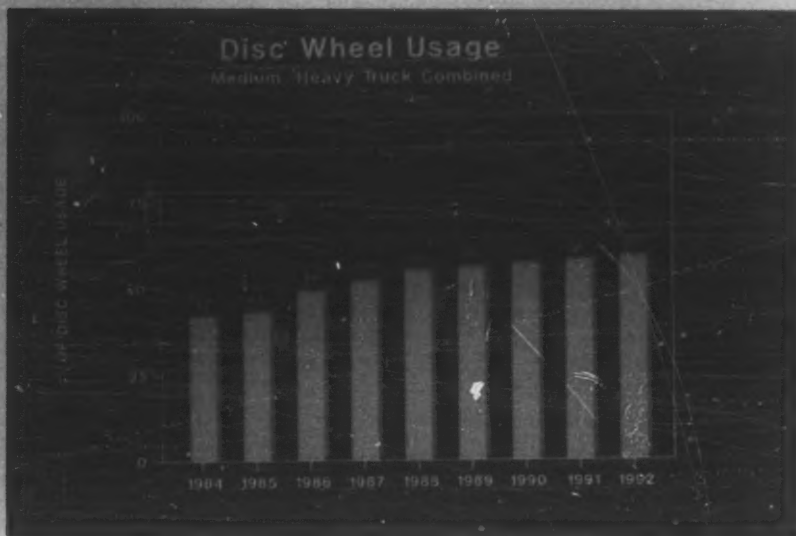
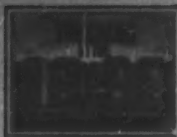
Wheels, tires, suspensions

Expect to see smaller wheel diameters, expanded use of hub-piloted systems, larger market share for disc wheels over spoke, stan-

Continued



Ross/TRW speed-sensitive steering for linehaul vehicles reduces power assist as vehicle speed increases, for improved road feel. And at low speeds, assist is increased for greater maneuverability.



Disc wheel market share will grow more slowly into the '90s—trailers will remain strong on spoke wheels.

dardization of sizes and modest increases in the use of wide-base or super-single tire/wheel systems. In other words, expect to see current trends continue.

Bill Kozyra, chief engineer for Budd, expects to see 19.5- and 17.5-in. wheels in the '90s.

"The industry would like the smallest wheel possible to reduce trailer floor height, allowing an increase in cube and more productivity potential," he says. The obvious impediment is that you can only get so small before running into packaging and brake cooling problems. Kozyra sees the downsize shift first to 19.5-in. and, eventually, to 17.5-in.

Bill Noll, manager of product quality for Accuride confides: "All of our programs are toward downsizing (from 22.5 in.) to 19.5-in. and 17.5-in. on large trucks and 19.6 x 675 for mediums." He feels the trend toward disc wheels will slow down a bit in the '90s.

"Our projection for 1992 is 59%

nondemountable (disc) wheels. One of the reasons holding back the conversion is that trailers still use a lot of demountable rims. We project a big increase in hub-mounted or hub-piloted tubeless wheel sales."

Robert Smith, manager, field engineering for Motor Wheel, agrees with most other industry experts that hub-pilot mountings—both 8- and 10-hole—will continue to grow at the expense of spoke and old style disc wheels.

It is likely that what's left of the tube-type wheel/tire market will be in P&D, metro operations, where sidewall damage is perceived to be more of a factor.

In a move intended to aid globalized truck component sourcing, the Society of Automotive Engineers (SAE), in May 1988, revised Standard J694 to define wheel mounting systems in accordance with the methods of the International Standards Organization. This and similar moves will help

suppliers improve design interchangeability and reduce costs on a global scale.

One big question for the 1990s is about the growth of wide-base or super-single tire/wheel systems. The primary advantage is that super singles weigh less than the duals they replace—a couple of hundred pounds less per vehicle, other things being equal. Combined with wide-base aluminum wheels, the weight saving looks even more attractive for applications where weight limits are typically reached before volume capacity.

Perceived disadvantages involve on-the-road tire failure and reduced roll stability (an axle's track is narrowed when duals are replaced with super singles, and wheel offset is not changed).

"I see super singles as filling a specific, vocational niche," says Dave Laubie, engineering director for Bridgestone.

One area of improvement that could help prevent road surface and cargo damage is suspensions.

Frank Stevens, vice president, marketing, Hendrickson, said: "Air ride will reach a market share of 40% to 50% in the '90s, up from 25% to 30% today."

The shift to air ride is being eased a bit by price reductions (relative to the price of a truck), maintenance requirements becoming comparable to those of spring suspensions, and the desire for improved ride quality. In addition to driver comfort, sheet metal fasteners, hoses, wiring harnesses, connectors, light bulbs and fragile cargo benefit from reduced vibrations.

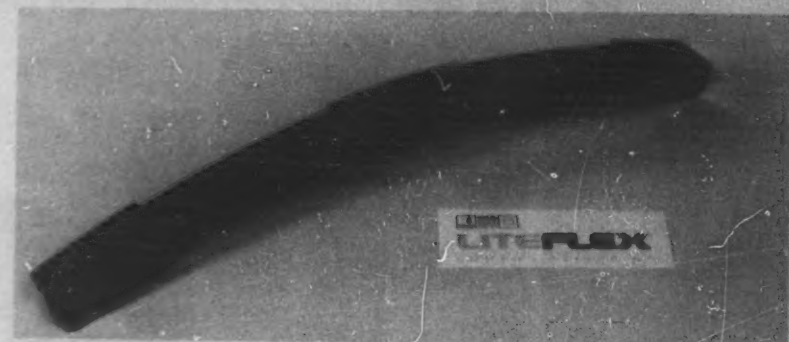
But the durable leaf spring will not be left in the air ride's dust. Future steel-spring suspensions should provide a better ride than today's springs, as engineers take advantage of stronger and lighter materials. More precise control of

heat treating has resulted in higher stress levels that will extend spring life to two to five times that of conventional springs.

Since new alloy spring steel can handle substantially higher stresses, pound for pound, spring assemblies will be lighter and more durable. In some cases, new two-leaf springs are replacing three-leaf springs, outlasting them and providing a better ride.

A development to watch is the composite leaf spring. A composite spring is made from a matrix—usually some sort of fiberglass or carbon fiber—held together with a plastic resin. The advantage of this spring is that it is lighter than a steel spring of identical load rating. Disadvantages include a premium cost and a tendency to delaminate.

Dave Richard, assistant project engineer, Inland Div., GMC, claims: "Our composite spring weighs 17½ pounds and matches



Fiberglass composite springs weigh ⅓ to ¼ as much as steel springs of the same capacity. Unfortunately, they're also five times more expensive, and are sensitive to heat. Look for limited use in the mid to late '90s, as these problems are overcome.

loads with a steel spring weighing 65 pounds.

"Bulk operators tell us they can get a payback on this spring in two to three months," Richard continues. "But other carriers will not easily be sold a premium product like the composite, except perhaps from a durability angle."

Durability, according to Richard, has been validated at 200,000

cycles, with a long-term projection of more than 1,000,000 cycles. Testing was performed in accordance with the Truck Trailer Manufacturers Association room-temperature fatigue test guidelines, wherein the springs are stroked to 1½ times their working travel. A steel spring, says Richard, will go about 200,000 maximum cycles.

Another potential advantage of composites is referred to as the soft failure mode. Spring failure is telegraphed by fibers protruding from the spring. Eventually, the vehicle sags to one side. If the composite spring fails beyond the protruding fiber stage, the spring tends to splinter and separates longitudinally. When that happens, 70% of the rated capacity is lost, but the spring acts like a soft steel spring rather than a broken one.

Drawbacks to composite springs include a delamination tendency when exposed to temperatures over 200°F. Another is cost—an estimated five times that of steel springs. "It's possible that we'll see composites used in the '90s," speculates Navistar's Stanley. "But trucks will never create the necessary volume infrastructure needed to bring down the price." [Its] success...will be first driven by passenger-car acceptance. □



Low-profile popularity will continue to grow with cube-conscious haulers, especially 19.5-in. and 17.5-in. sizes.